(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 0 844 439 A2

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
27.05.1998 Bulletin 1998/22

(51) Int Cl.[6]: **F23M 9/02**

(21) Application number: **97830562.1**

(22) Date of filing: **31.10.1997**

(84) Designated Contracting States:
AT BE CH DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE
Designated Extension States:
AL LT LV RO SI

(30) Priority: **22.11.1996 IT RE960093**

(71) Applicant: **Tecwork S.r.l. Impianti Tecnologici**
42015 Correggio (RE) (IT)

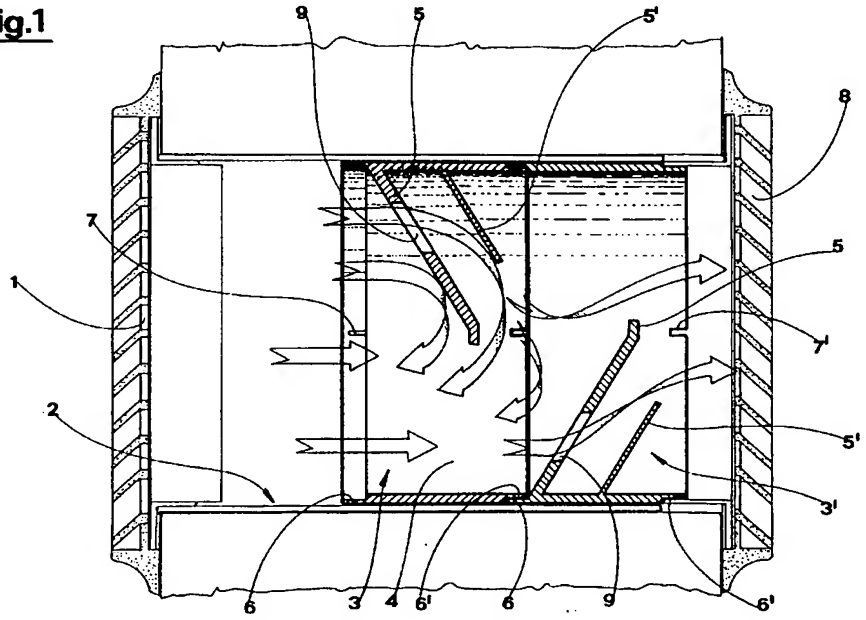
(72) Inventor: **Gatti, Andrea**
42015 Correggio (RE) (IT)

(74) Representative: **Lanzoni, Luciano**
c/o BUGNION S.p.A.
Via Roma, 38
42100 Reggio Emilia (IT)

(54) Wind-protection air intake vent

(57) A wind-protection air intake vent is installed inside a duct (2) which connects the external environment to an internal environment. The said duct (2) has located inside it at least one first vane (5) which is inclined with respect to the longitudinal axis of the duct (2) so that its surface directed towards the said external environment forms an acute angle with the direction of the flow along the duct (2) from the external environment to the internal environment. Between the first vane (5) and the said internal environment there is arranged, at a predetermined distance from the first vane (5), a second vane (5') which intercepts entirely the projected path, along the longitudinal axis of the duct (2), of an aperture or window (9) formed on the first vane (5).

Fig.1



EP 0 844 439 A2

Printed by Jouve, 75001 PARIS (FR)

Description

The present invention relates to an air intake vent to be mounted on peripheral, or in any case external, walls of buildings, with the purpose of ensuring a correct supply of combustion air to lighting sources installed inside the premises, in particular in connection with the combustion of gases in boilers of independent heating systems.

It is known that, in most cases, the supplying of combustion air to burners installed inside the premises is ensured by forming holes of suitable diameter in the external walls in the vicinity of the burner, complying with inflow cross-sections defined by precise regulations.

It is also known that, in accordance with correct plant engineering practice as well as the applicable regulations, at least one of said vents intended to supply external air into the premises where a burner is operational, should be installed in the bottom part of the external wall, close to the ground.

For some time certain types of prefabricated vents have been known, said vents having both a circular cross-section and a rectangular or square cross-section and consisting of a vaned external grill, a meshwork located immediately behind the grill in order to prevent the entry of small animals or insects, a tubular conduit with a constant cross-section complying with the local regulations, and an internal grill which is also usually vaned.

These known vents have the drawback that they give rise to bothersome air currents in the vicinity of the grill inside the dwelling, such that uncomfortable and even untolerable living conditions occur in the presence of wind, owing to the gusts of cold air which flow into the premises where the grill is installed.

As an unfortunate consequence of this discomfort, in practice it happens that the occupants of the dwelling often imprudently block up the vent to eliminate the problem of the gusts of cold air which enter the premises; this blocking operation is performed, for example, using a makeshift partition (for example made of cardboard) which is fitted onto one of the grills of vent, and is a decidedly dangerous measure, since it cancels out the advantages which are intended to be achieved by installation of the vent, and creates conditions of real danger of toxic asphyxiation for the occupants of the dwelling.

The object of the present invention is to provide an air intake vent which allows correct ventilation of the premises where a burner is installed and at the same time eliminates, or greatly lessens, the discomfort resulting from gusts of air entering the dwelling, in particular during windy weather conditions.

A further object is to provide a vent which can be easily installed and at the same time is operationally reliable since it ensures a continuity of air flow while complying with the minimum cross-sections suitable for the capacity of the burner installed inside.

These objects are achieved by providing inside the duct forming the central part of the vent a pair of vanes inclined in the direction of flow (i.e. from the outside towards the inside) and occupying substantially one half of the duct cross-section, the first of said vanes being provided with a large slit, and the second being located at a distance and substantially parallel to the first one opposite the slit; and moreover by installing a second pair identical to the first pair, but oriented in the opposite direction in that it occupies in succession the duct part not occupied by the first pair.

The invention will emerge more clearly from the description of an example of embodiment described hereinbelow with the aid of two illustrative plates. In these plates, Fig. 1 shows a longitudinally sectioned view of a vent provided in accordance with the invention; Fig. 2 shows a front view of one of the base elements forming the central part of the vent; Fig. 3 shows a cross-sectional view along the plane indicated by III-III in Figure 2; while Fig. 4 shows a partially sectioned axonometric view, observed from the external environment side.

With reference to these Figures, 1 denotes a known external grill provided with vaning and 8 a known internal inlet grill.

2 denotes a duct forming the central part of the vent which, in the case exemplified, has a circular shape; the duct 2 connects the external environment to an internal environment where, for example, a burner of a boiler operates. 3 denotes a base element of the vent consisting of a tubular body 4 provided at the ends with telescopic-type connections 6, 6' and an inclined double vaning 5, 5' oriented in the direction of the air flow indicated by the arrows in Fig. 1.

The double vaning comprises at least one first vane 5, which is located inside the duct 2 and which extends from the periphery towards the centre of the duct 2 itself. The first vane 5 is inclined with respect to the longitudinal axis of the duct 2 so that its surface directed towards the external enviroment forms an acute angle with the direction of the flow along the duct 2 from the external environment towards the internal environment.

The double vaning also comprises a second vane 5' which is arranged between the first vane 5 and the internal environment at a predetermined distance from the first vane 5 and is located with an inclination substantially identical to that of the first vane 5.

9 denotes a wide aperture or window formed on the first vane 5 in the vicinity of the wall of the tubular body 4. The aperture 9 has an elongated shape with an arrangement parallel to the end edge of the first vane 5. The second vane 5' is located so as to face the aperture 9 at a distance d. The aperture 9 is formed and arranged so that its projected path along the longitudinal axis of the duct 2 is intercepted entirely by the second vane 5'.

In the example illustrated, the externally directed surface of the first vane 5 forms an angle of 60° with the direction of the flow along the duct from the external environment towards the internal environment; this value may, moreover, normally vary from a minimum of 30° to

a maximum of 70°.

Also in the example illustrated, the value of the distance d is usually equal to 1/8th of the internal diameter of the tubular body 4; the value of the distance d may moreover usually vary within a range of 1/12th to 1/4er of the value of this internal diameter. It is moreover envisaged that the first vane 5 should extend as far as the halfway point of the internal channel delimited by the tubular body 4, terminating in a thin bent-back edge 10 arranged along an internal diameter of the aforementioned channel.

In the embodiment illustrated, two base elements 3, 3' of the vent are provided, said elements being identical to one another and being arranged in succession with one another. The two elements 3, 3' are rotated through 180° with respect to one another about the common longitudinal axis.

7, 7' denotes two male and female locating means of the interlocking type designed to ensure correct connection of an element 3 with a successive identical element 3' rotated through 180° with respect to the first one. The elements 3, 3' are joined together by telescopic-type connections 6, 6' and are correctly positionned with respect to one another by the interlocking locating means 7, 7'. In this way the vanes 5, 5' of the base element 3 occupy the top half of the duct 2, while the vanes 5, 5 ' of the other base element 3' occupy the bottom half thereof.

Operation is as follows:

First of all the most suitable size of vent is chosen on the basis of the application of normal parameters, depending on the capacity of the burner installed inside and as directed by any regulations.

Once the dimensions of the vent have been chosen, an element 3 is installed in the central section of the duct 2, together with, in succession, a second identical element 3' in a position rotated by 180° with respect to the first element. The vent is completed by the fitting of known end grills 1, 8.

The presence of the locating elements 7, 7' which necessarily interlock ensures that incorrect mutual positioning of the two coupled elements 3, 3' inside the vent may be avoided.

When there is no external ventilation and no substantial difference in pressure between the external environment and the internal environment, the flow of air through the vent will have substantially laminar characteristics, depending on the appropriate flow cross-sections formed by the aperture 9 and the cross-sectional part left free by the first vanes 5.

Supplying of the primary and secondary combustion air to the burner will therefore be performed with perfect regularity, there being no obstacles to the air flow through the vent.

When, on the other hand, there is a greater pressure in the vicinity of the vent and in particular a dynamic pressure consisting of gusts of wind, the air flow inside the vent will become turbulent, following a simplified path illustrated in Fig. 1 by the direction of the arrows.

The consequence of this will be that the internal turbulence induced by the form of the vanes 5, 5', in particular in the zone between the element 3 and the successive element 3', will cause a substantial slowing down of the flow and will therefore prevent the external gusts of wind, together with their bothersome effects, from being felt inside.

Although shown in the example illustrated as a vent with a circular cross-section, numerous variations of the invention are possible, for example vents with a square or rectangular cross-section.

Although shown with two identical elements 3, 3' inserted and rotated in succession through 180° with respect to one other, the invention may also be realized, albeit with less effectiveness, with only one of these elements 3.

Claims

1. Wind-protection air intake vent which can be installed in a duct (2) which connects an internal environment to the external environment, characterized in that it comprises:

   - at least one first vane (5), which is located inside the said duct (2) and which extends from the periphery towards the centre of the duct (2), said first vane (5) being inclined with respect to the longitudinal axis of the duct (2) so that its surface directed towards the said external environment forms an acute angle with the direction of the flow along the duct (2) from the external environment to the internal environment, said first vane (5) having at least one aperture or window (9);
   - at least one second vane (5') arranged between the first vane (5) and the said internal environment at a predetermined distance from the first vane (5) and in such a way that the projected path of the said aperture (9) along the longitudinal axis of the duct (2) is entirely intercepted by the second vane (5').

2. Vent according to Claim 1, characterized in that the first vane (5) and the second vane (5') are arranged on a base element (3, 3') having a tubular body (4) which can be inserted inside the said duct (2).

3. Vent according to Claim 2, characterized in that the said first vane (5) extends as far as the halfway point of the internal channel delimited by the said tubular body (4).

4. Vent according to Claim 3, characterized in that it

comprises two said base elements (3, 3') which are identical to one another and arranged following one another in the direction of the longitudinal axis of the channel (2) and rotated through 180° with respect to one another.

5. Vent according to Claim 4, characterized in that the said base elements (3, 3') are joined together by telescopic-type connections (6, 6') and are positioned with respect to one another by locating means (7, 7') of the interlocking type.

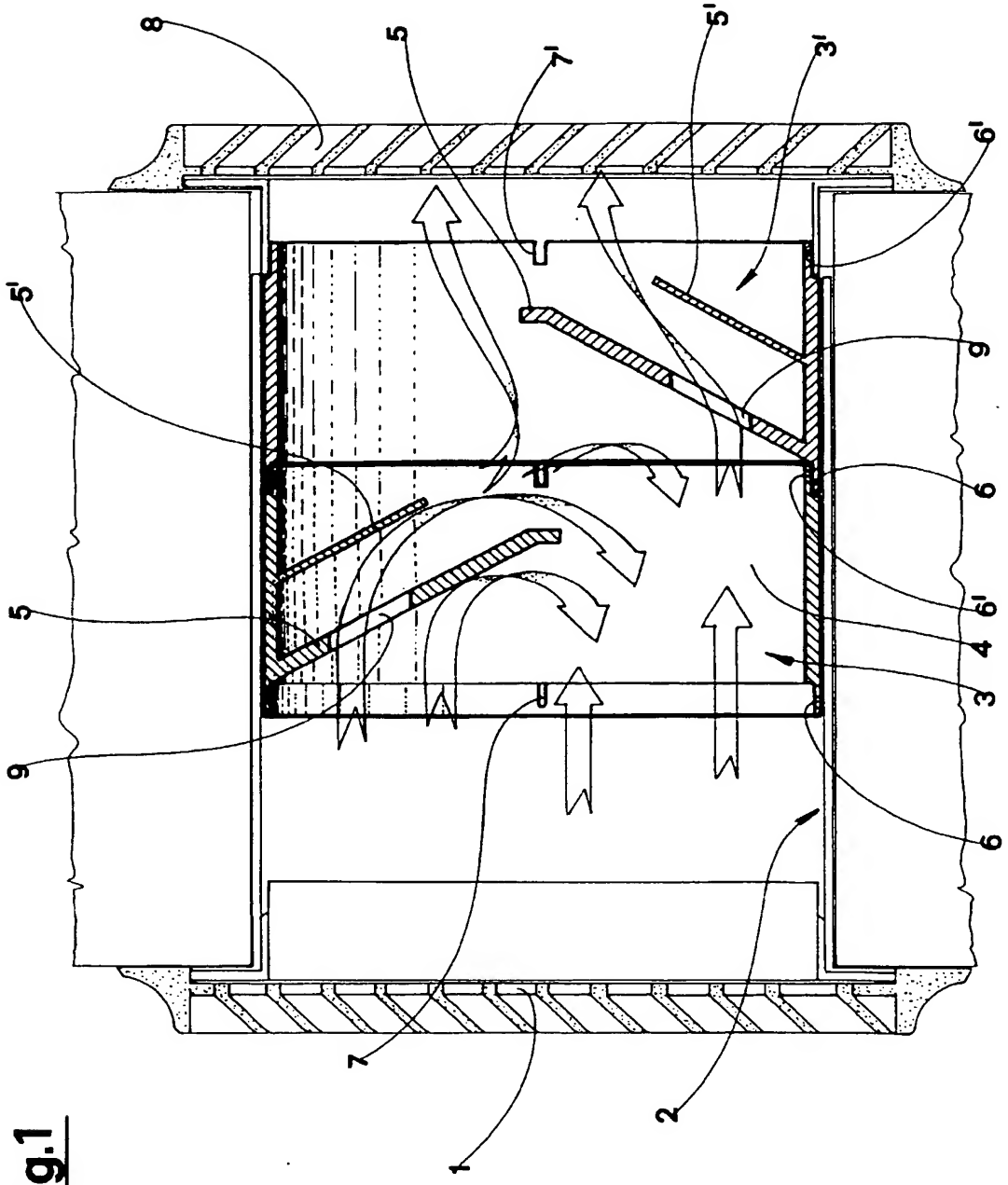


Fig.1

Fig.3

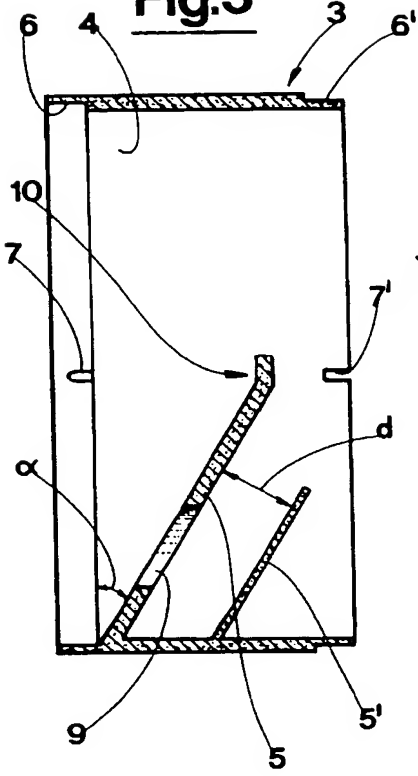
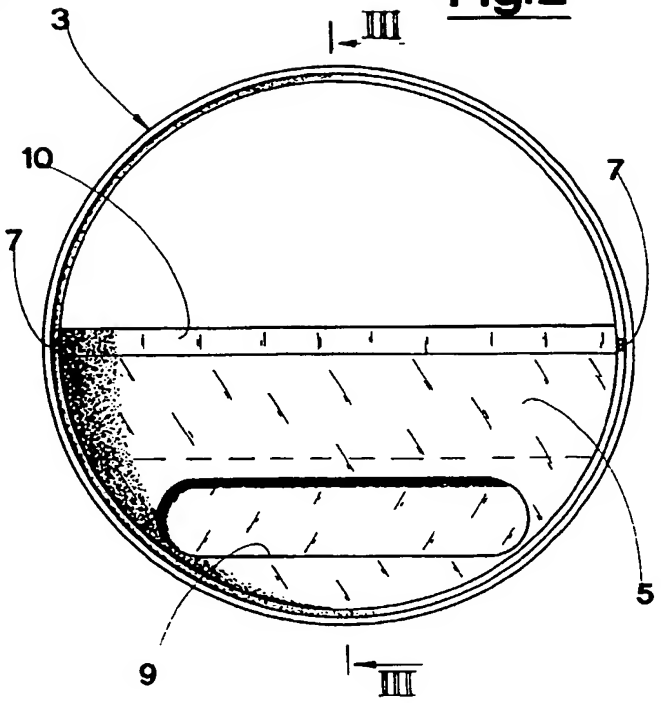


Fig.2



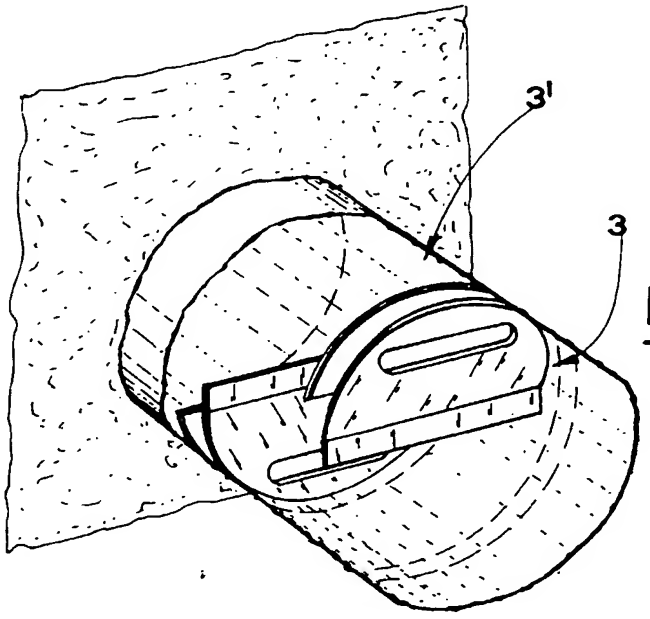


Fig.4